Gaia and OGLE TDE search

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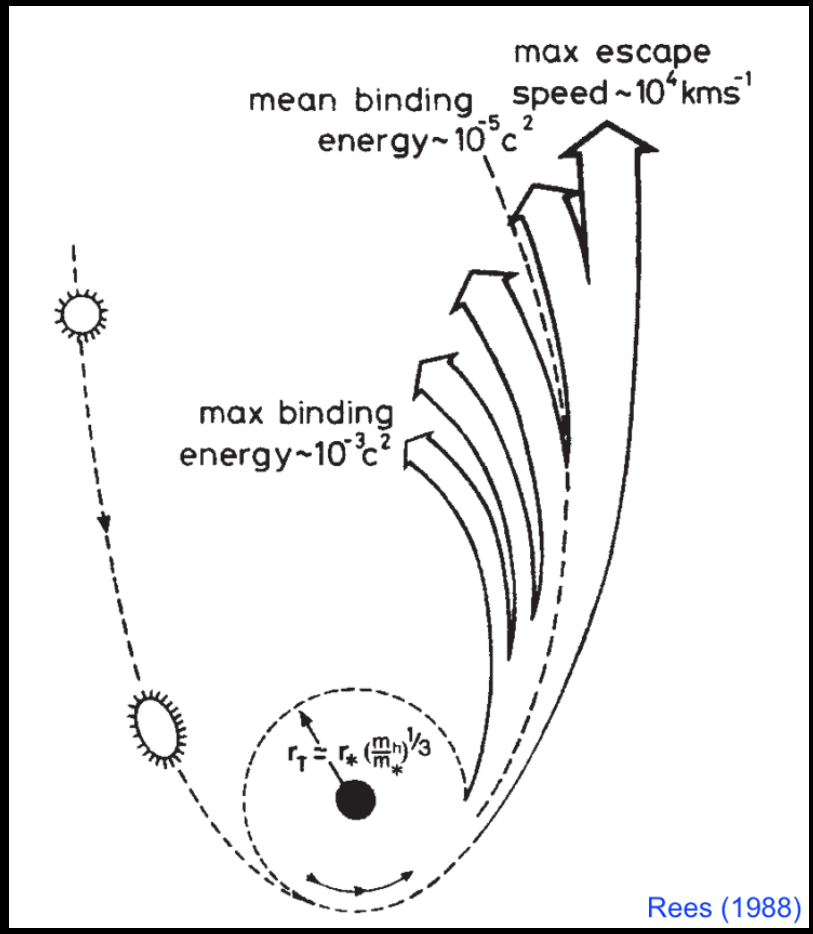
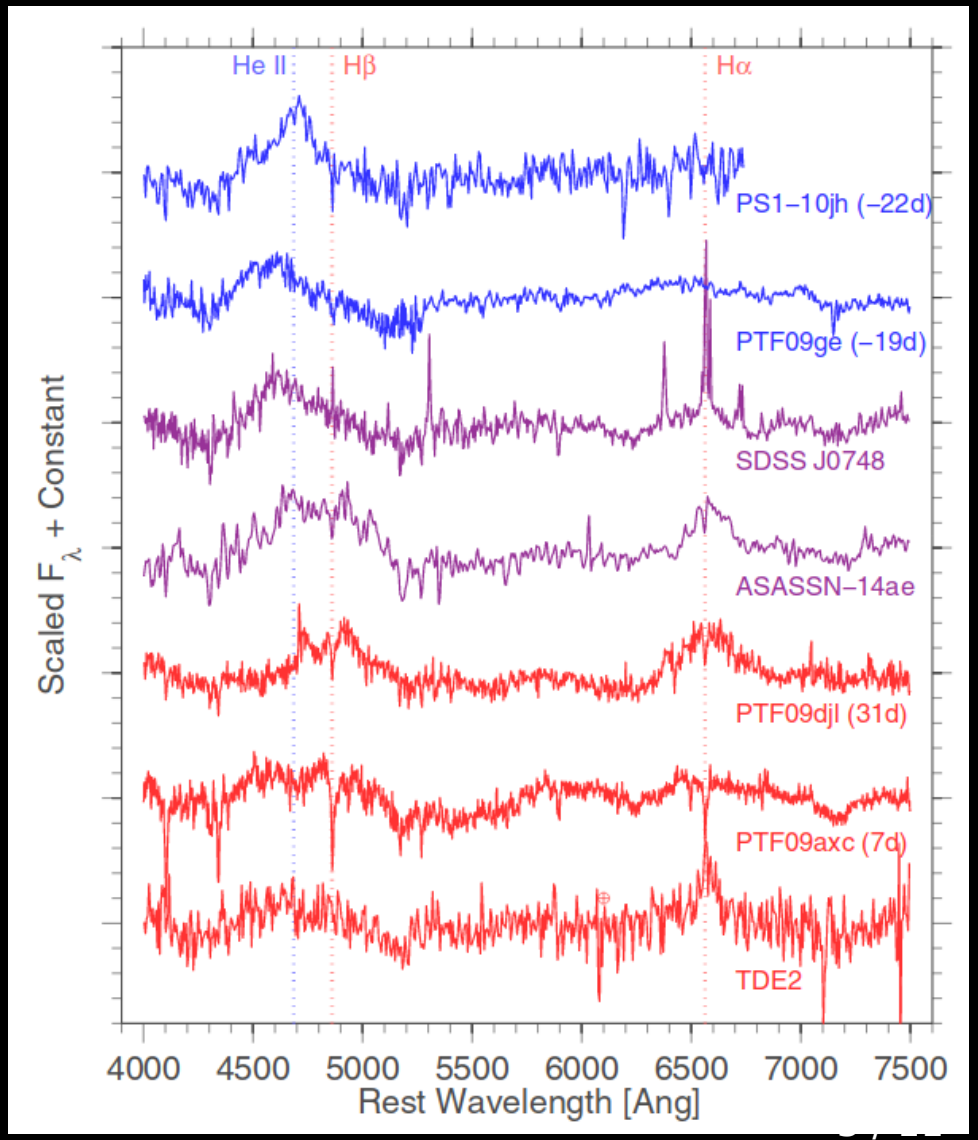
Tidal Disruption Events

- $M_{BH} \approx 10^6$-$10^8 M_\odot$
- $M_* \approx M_\odot$
- -20 up to -23 mag
- 10^4-10^5 K



Tidal Disruption Events

- Blue spectrum, corresponding to black-body T>10000 K
- Broad HeII lines
- Photometric lightcurve fitted with $t^{-5/3}$



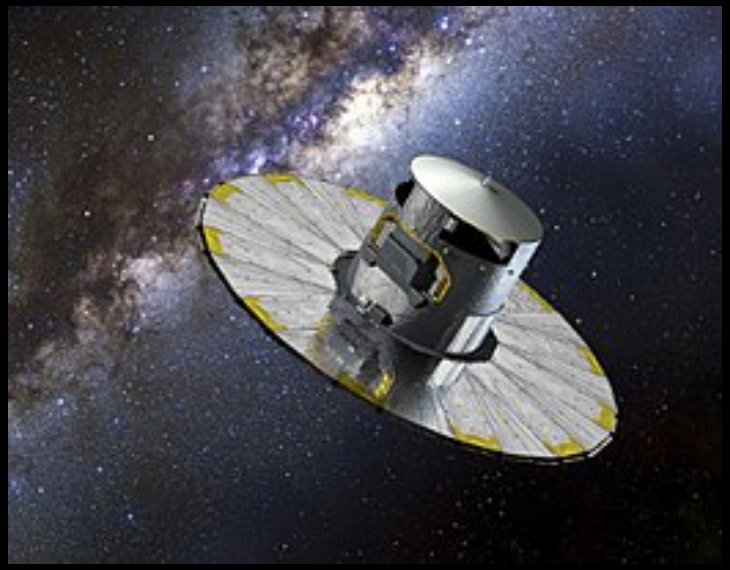
Nuclear transients

- Supernovae Ia:
  bright, M=-19.5mag
- Core-collapse SNe:
  fainter, variety of
  subtypes
- AGNs, blazars

Surveys:

Gaia

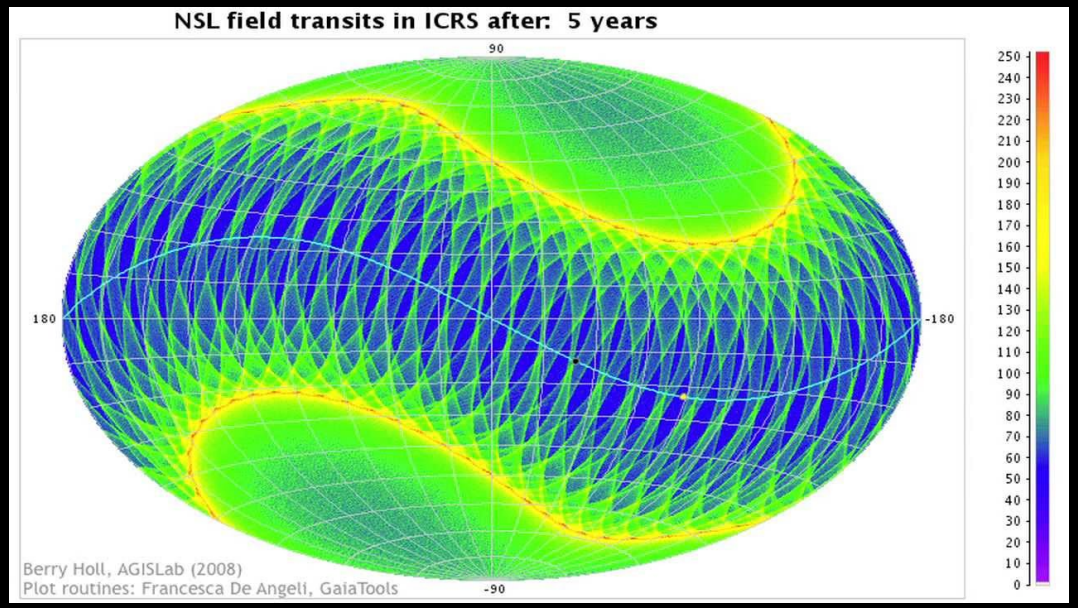
- All-sky coverage,
- Photometry reaching V=20 mag
- 2 observations 106 min apart

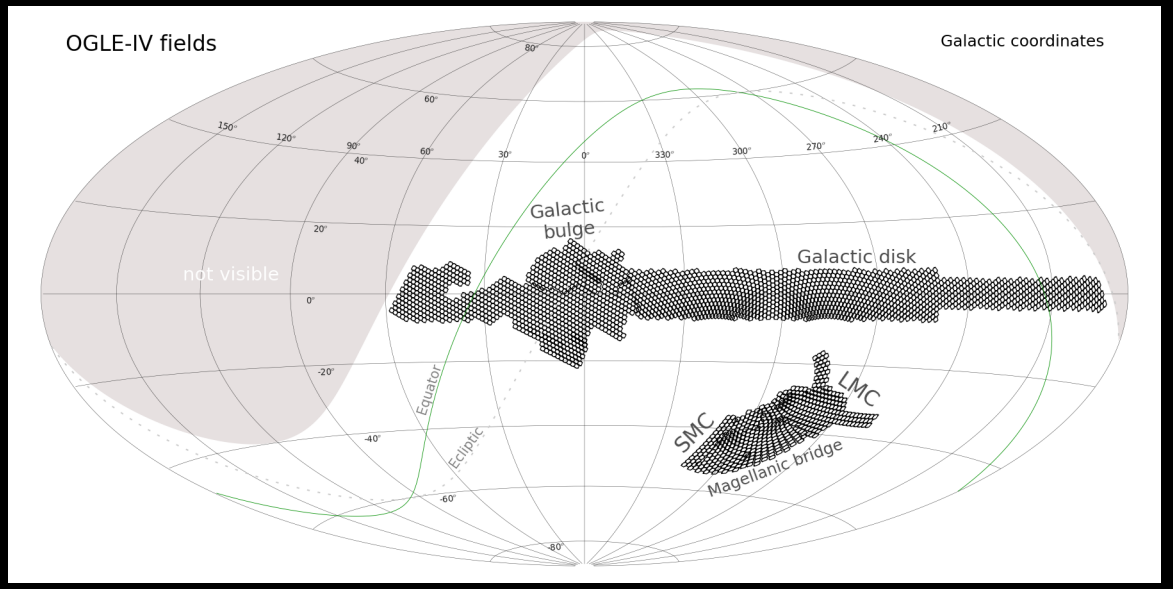


OGLE

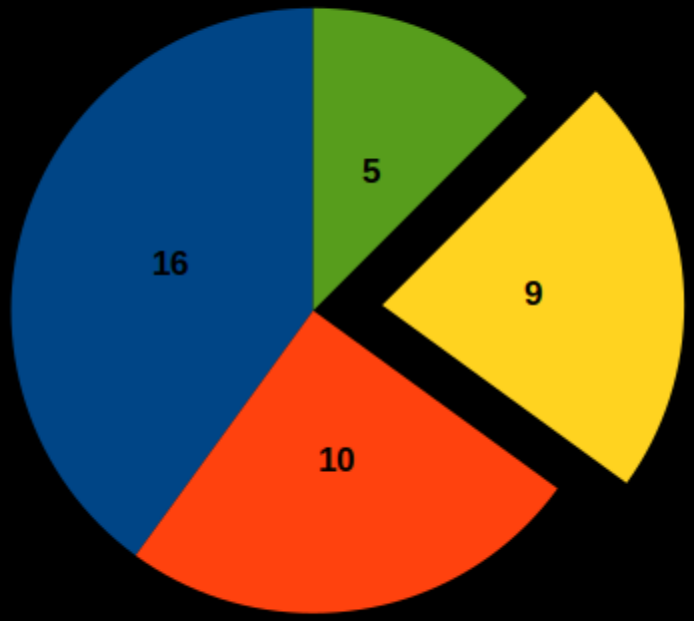
- Las Campanas, Chile
- Bulge, disc, Magellanic Clouds, Magellanic Bridge
- Photometry up to I≈22 mag
- 3-4 day cadence

Sky coverage



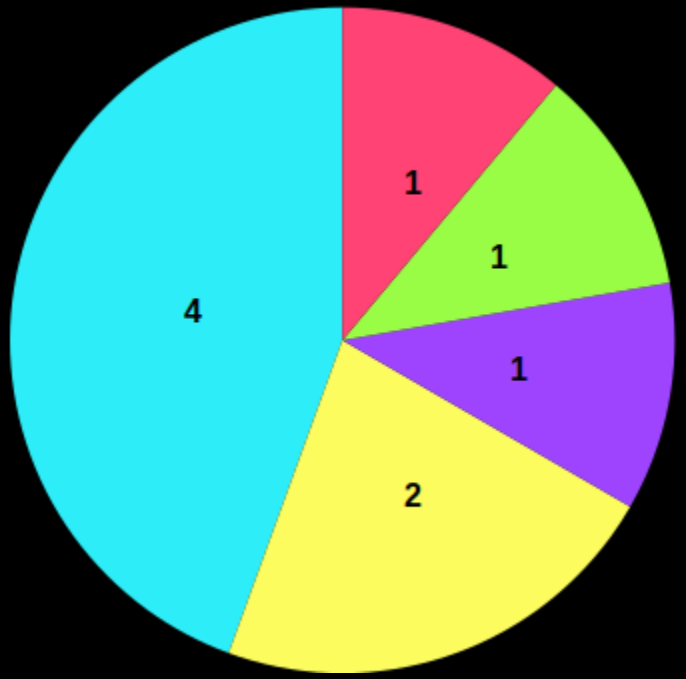


Observations: September 2017-March 2018



previously detected
not visible
Follow-up
SNIa

Follow-up: VLT, SALT, Swift



SN Ia
SN Iip
blazar
AGN flair
TDE ?

Name	RA, dec	TNS name	survey	al. mag	abs mag	follow-up	redshift	SNID
Gaia17cen	05:05:44.39 -23:23:50.93	AT2017gld	Gaia	20.56	-19.09	SALT	0.077	SN Ia
Gaia17cmd	07:41:45.5 +16:13:06.10	AT2017har	Gaia	18.38	-20.11	VLT, Swif	0.110	AGN flare
OGLE17hil	05:57:30.04 -62:28:44.60	AT2017hil	OGLE	18.56	-18.59	VLT	0.061	SN Ia
Gaia17dbg	22:54:13.35 -21:41:00.08	AT2017gul	Gaia	18.35	-21.45	SALT, VLT, Swift	0.192	TDE ?
Gaia17cqz	21:47:57.52 -58:10:58.12	AT2017hrw	Gaia	18.85	-16.39	SALT	0.026	SN IIp
Gaia18aql	16:07:15.74 +26:11:48.05	AT2018zo	Gaia	18.49	-18.37	VLT	0.054	SN Ia
Gaia18aoq	13:55:07.91 -38:23:22.74	AT2018aev	Gaia	18.61	-16.63	VLT	0.026	SN IIp
Gaia18aeo	03:06:37.26 -36:37:05.92	AT2018ig	Gaia	18.25	-19.61	SALT	0.086	SN Ia
OGLE18wc	05:18:11.72 -51:44:03.97	AT2018wc	OGLE	19.915	-20.22	VLT, SALT, Swift	0.220	blazar

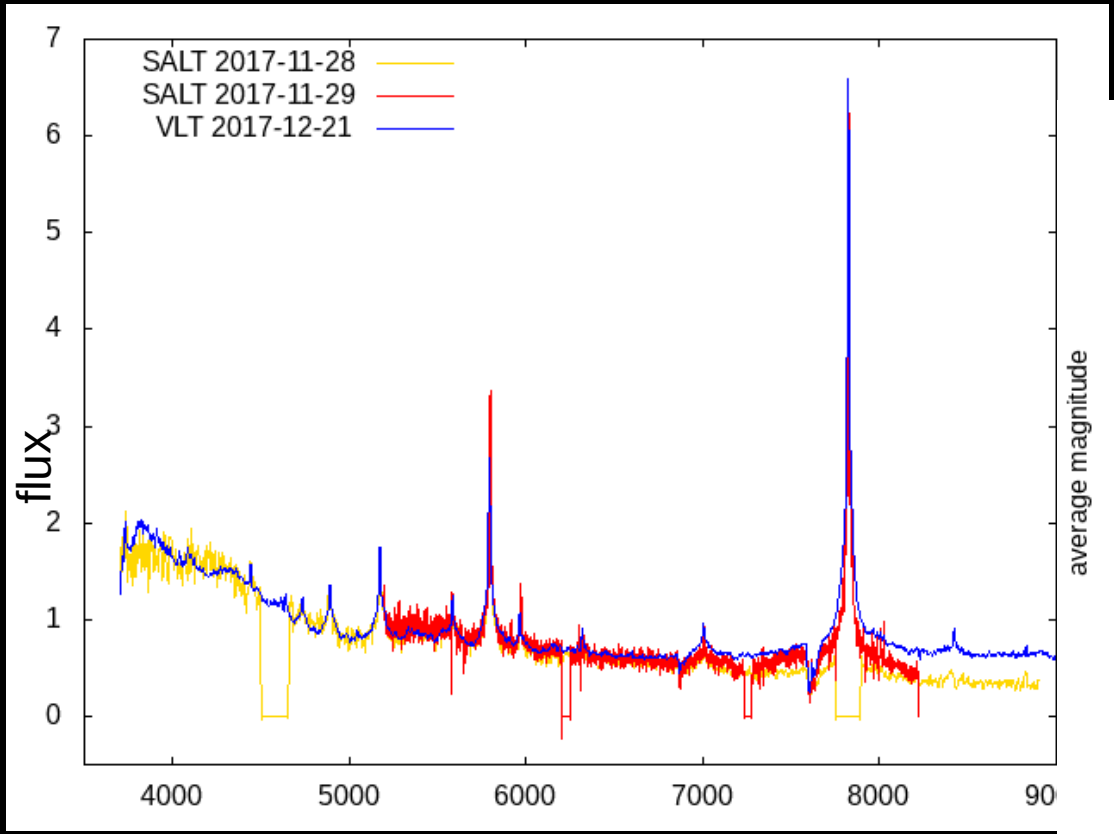
Gaia17dbg

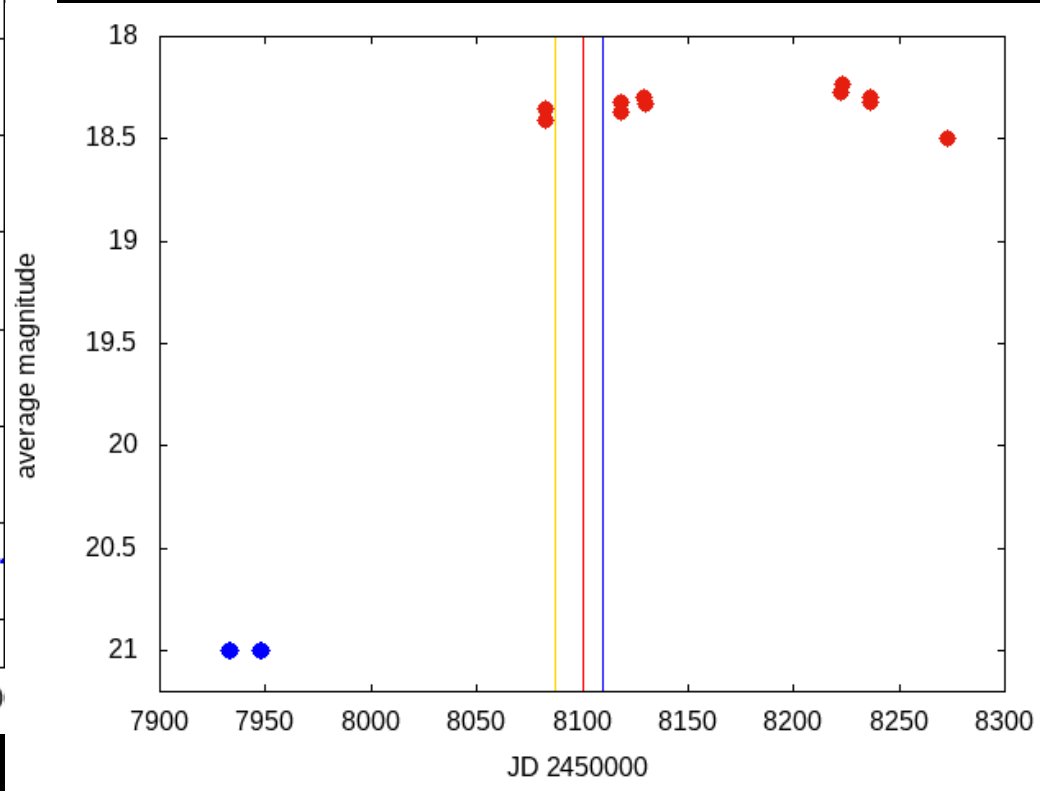
RA= 22:54:13.35
dec=-21:41:00.08

z=0.192
M_G=-21.45
Swift UV detection, T=27000K

2017-11-25

TDE candidate

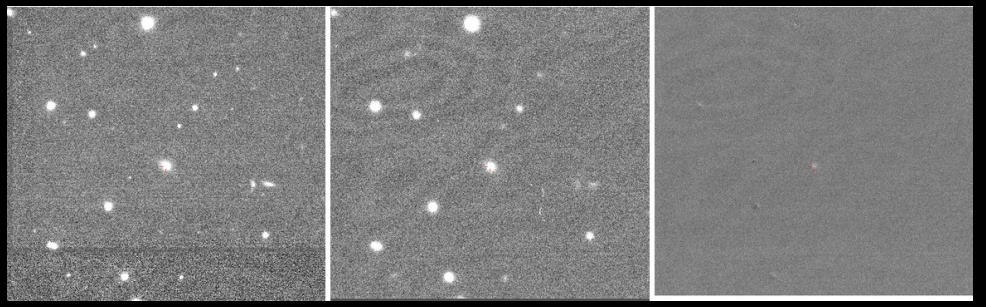




OGLE18wc

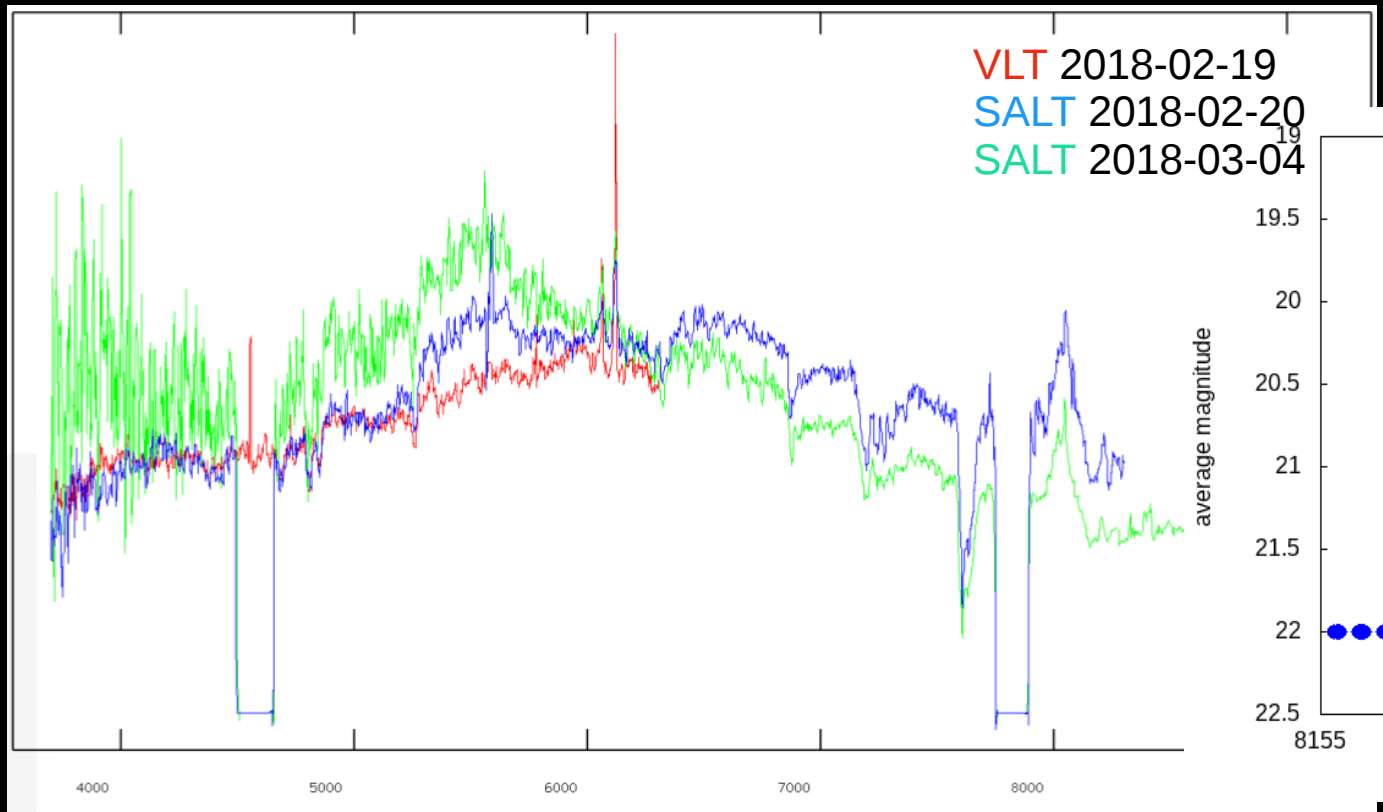
RA= 5:18:11.71
dec= -51:44:04.0

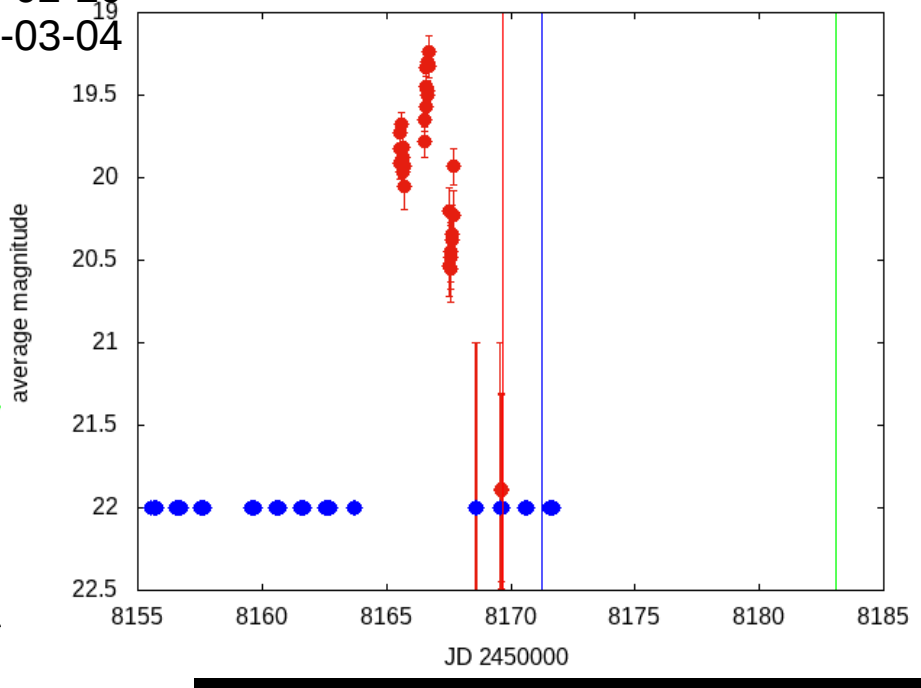
z=0.22
M_G=-20.22
Swift, X-ray and UV source



2018-02-16

FLARING BLAZAR





Conclusion

- SNIa were the most common during this search
- Photometric detection is not enough for classification, multiwavelength follow-up is needed!
- TDEs are hard to find
- Search continues...